

Phosphorus &



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PHOSPHORUS

IN

FUNCTIONAL DISORDERS

OF THE

NERVOUS SYSTEM,

INDUCED BY

—OVER-WORK—

AND OTHER INFLUENCES INCIDENTAL TO

MODERN LIFE.

With Formulæ and Treatment.

*Compiled from Monograph by E. A. Kirby, M.D., Member of the
Royal College of Surgeons; Prof. J. A. Thompson, Physician
to the City Dispensary, London,*

AND FROM OTHER AUTHORS

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INTRODUCTION.

THE following pages consist, for the most part, of contributions on the use of Phosphorus in its elementary state by various prominent authors. Their experience in the employment of this potent agent has been of so gratifying a character, as to confirm the general impression of the profession that in certain affections,—those of the nervous system especially—it is one of the most valuable remedies which modern therapeutics has developed and perfected. Until a comparatively recent date, Phosphorus was but little prescribed by the practitioner, and even so distinguished a writer as Pereira declared, not many years since, that in England it was but rarely employed, and that it would be unnecessary, therefore, to enter minutely into an account of its uses. The physician, even though anxious to prescribe it in cases in which it would seem to be indicated, was timid, lest from its faulty or imperfect pharmaceutical preparation, it might, by its dangerous chemical characteristics, produce violent irritation or inflammation. It remained for the skillful pharmacist to place it in such a palatable and innocuous shape for administration, that in medicinal doses it could be prescribed with perfect safety and with undoubted assurance that its full therapeutic value might be realized. Such a desirable consummation was effected in 1870 by the introduction to the profession of the pilular form by WM. R. WARNER & CO., as the most reliable and convenient method of administering it. It may be unhesitatingly asserted that such a discovery has been the means of gaining for this remedy a very conspicuous position in the materia medica of the present day, inspiring confidence in the place of distrust, and offering the long coveted opportunity of testing to the full extent its efficacy in some of those painful and other diseases, in which the nervous system plays so important a part. The experience of private and hospital practice has confirmed the general verdict of the profession in favor of this form of administration of Phosphorus, and the columns of the medical journals.

of this and other countries contain numerous recent contributions to the same purport. When thus administered, properly protected from all deleterious chemical changes, it is as safe a remedy as any other that may be prescribed by the physician, whilst it exhibits specific therapeutic qualities which belong to no other agent. Not a single case has been reported in which injurious effects have resulted from the use of Phosphorus pills, made by the perfected method discovered and applied by WM. R. WARNER & CO. It is very generally acknowledged that sugar, from its preservative qualities, especially as a preventive of oxidation, is the best coating material for this substance. It would be safe, perhaps, to assert that the poisonous qualities which were formerly ascribed to this article were almost wholly due to the imperfection of its method of preparation. It is for the physician, after choosing judiciously the cases in which its use would appear to be indicated, to administer it in that form in which its potency may be most usefully developed, without attendant disturbance or irritation, of the digestive organs more particularly. This pilular form fulfils all these conditions perfectly, and should, therefore, supersede all others for administering it.

The practical value of Phosphorus as a therapeutic agent will be considered in the following pages as it exists normally in the human subject, in its applicability to the cure of disease, and especially in those various disordered conditions consequent upon OVERWORK, which are characteristic of modern civilization. Indeed it is to this great bane of modern life, which exhausts the vital energies of thousands of useful and valuable citizens, that Phosphorus is called upon to display its almost antidotal power in renovating nerve-tissue or giving tone to the shattered system. Its proper mode of administration and dose will also be discussed, and illustrative cases cited to substantiate its claims upon the attention of the practitioner.

PHOSPHORUS.

ITS PHYSIOLOGICAL AND PATHOLOGICAL RELATIONS, REMEDIAL VALUE, MEDICINAL PROPERTIES, AND THERAPEUTIC USES.

PHYSIOLOGY furnishes us with a rational explanation of the remedial value of Phosphorus; and it further explains the pathological conditions or morbid states of the system under which it may be administered with advantage. But to many the testimony of clinical experience and the deductions of carefully-conducted experiments are more satisfactory than any theory based upon physiological data, however reasonable it may appear. Many persons think, with Professor Stillé, that "simple experience forms the only crucible in which a therapeutical fact or doctrine can be fairly tried; and whatever sustains this test may be accepted as a real and permanent addition to our therapeutical resources." While thoroughly endorsing this opinion, a brief *résumé* of the physiological chemistry of Phosphorus will assist us in estimating its value in medicine.

Phosphorus, it is well known, is a normal constituent of the blood, and a never-failing ingredient in all the more important tissues and fluids of the body. It is a very important constituent of nerve tissue, and is found especially abundant (nearly two per cent.) in the great nerve centres.*

* The following, according to L'Héritier, is the chemical constitution of the nervous matter, and the relative proportion of its different constituents in individuals of different classes:—

	Infants.	Youths.	Adults.	Aged Persons.	Idiots.
Water	82.79	74.26	72.51	73.85	70.93
Albumen	7.00	10.20	9.40	8.65	8.40
Fat	3.45	5.30	6.10	4.32	5.00
Osmazome and Salts .	5.96	8.59	10.19	12.18	14.42
Phosphorus	0.80	1.65	1.80	1.00	0.85

It is a significant fact that it is found in all animal and vegetable juices, and occurs as phosphates in the mineral kingdom, in which form it is used to increase the fertility of the soil.

It will be remarked that the amount of *Phosphorus* is the greatest at the period of greatest mental vigor; and that in infancy, old age, and idiocy the proportion is not above half that which is present during the adolescent and adult periods.

According to Professor BORSARELLI (*Medical Times and Gazette*, Aug. 31, 1861, p. 229.) the quantity of Phosphorus in the brain of man varies from 1.352 to 1.790, the medium being triple the amount assigned to this organ by Persoz and Opermann.

In common with *iron*, *sulphur*, and *lime*, and other inorganic elements, Phosphorus is a very important alimentary principle, and whenever its supply is not in proportion to the needs of the economy, deterioration of nervous tissue and nervous force is an inevitable consequence.

These inorganic elements enter into the composition of the organs by which the conversion of latent into active force is effected. The cerebro-spinal system,—the brain and spinal cord and the nerves directly connected with these centres;—and the nerves of organic life, (the ganglionic system), which preside over, regulates, and controls the functions relating to nutrition and secretion,—are consequently structurally enfeebled whenever their supply is abnormally defective.

Our knowledge of the chemical constitution of the nervous system is confessedly unsatisfactory; it is known however that nerve substance proper contains the following proximate principles, viz., protagon, neurine, fatty matters combined with phosphorus, and bases combined with peculiar fatty acids.

Protagon $C_{116} H_{241} O_{22} N_4 P$ was discovered and described by Liebreich in 1865, and it is to this principle that the solidity of the brain is thought to be due. It is interesting to know that quite recently three classes of phosphorized bodies have been discovered in the brain, viz., kephalius, myelius, and lecithius, containing glycerophosphoric acid as a proximate nucleus.

It would appear, therefore, that the presence of Phosphorus in its normal proportion is necessary to the structural integrity of these important nervous centres,—to their growth and development in the young, as well as to their maintenance and perfection in adolescence; and it follows that the evolution of nervous force is mainly dependent upon nutrition, and that it is liable to be exalted or diminished in proportion as this process is perfectly or imperfectly performed. Dr. Flint observes: “When new organic matter is appropriated by the tissues to supply the place of that which has become effete, the mineral substances are deposited with them; and the organic principles, as they become effete or are transformed into excrementitious substances and discharged from the body, are always thrown off in connection with the mineral substances which enter into their composition. This constant discharge of inorganic principles, forming as they do an essential part of the organism, *necessitates* their introduction with the food in order to maintain the normal constitution of the parts. As these principles are as necessary to the proper constitution of the body as any other, they must be considered as belonging to the class of *alimentary* substances. This conclusion is inevitable if alimen-

tation be regarded as the supply of material for the regeneration of the organism."

We know that every part of the organism is constantly undergoing physiological decay and repair, and this molecular change is a necessary and inevitable condition of life. When, therefore, the balance is lost, and the destructive process from any cause (defective supply of new material, or over exercise of functions) is in excess of that of repair, the organism falls into decay.

It is essential to the condition which we call HEALTH that waste of tissue be duly compensated by the appropriation of new material; and if this process fail, we have, as an inevitable consequence, not only structural deterioration of the organs themselves, but their functions become first weakened, then perverted, or imperfectly performed, and finally completely arrested.

In precisely the same sense that common salt is an alimentary substance, Phosphorus also is food; and it is a notable physiological fact, that those animal and vegetable substances which are richest in this element best sustain brain work, renovate nerve tissue, and restore nervous energy when enfeebled by disease or temporarily depressed by excessive activity.

We have seen that functional activity of the nervous system produces disintegration, and waste of nervous matter; and it does appear that there is an especial relation between the quantity of Phosphorus oxidized and the amount of force expended and nerve tissue destroyed.

Stepping from physiology into the domain of pathology, we find that disease destroys life by using up too rapidly the supply of nerve force. We discover evidence of the fact that excessive activity of the nervous system increases the waste of Phosphorus; and whenever the elimination is increased, *nervous force is always reduced*, nutrition impaired, the nerve centres are damaged, functional disease induced, and life prematurely destroyed.

In inflammatory diseases of the brain there is reason to believe that an unusually rapid disintegration of tissue takes place, a marked increase of the alkaline phosphates in the urine being always present. It is also a fact, and one well known to brain-workers, as well as to physicians, that laborious mental work, especially if coupled with worry and anxiety, is constantly accompanied with an increased excretion of the Phosphorus compounds.

This devitalization and unusual waste takes place at the expense of the element, and unless it be compensated as sometimes it is, instinctively as it were, by an increased consumption of phosphorized food, the nervous centres, temporarily lose power, and a state of lowered vitality (*nervous*

exhaustion), so frequently experienced by hard-working professional and literary men, is induced. This condition is only relieved by a lengthened period of rest from mental labor, sleep, and nutritious food.

"Additional evidence," says Dr. Carpenter, "for the belief that the functional activity of the nervous tissue involves disintegration of its tissue by the agency of oxygen is found in the increase of *alkaline phosphates* in the urine when there has been any unusual demand upon the nervous power.

"No others of the soft tissues contain any large amount of Phosphorus; and the marked increase in these deposits, which has been continually observed to accompany long-continued *wear* of mind (whether by intellectual exertion or by the excitement of the feelings), and which follows any temporary strain upon its powers, may fairly be attributed to this cause.

"The most satisfactory proof is to be found in cases in which there is a periodical demand upon the mental power, as, for example, among clergymen, in the preparation for and discharge of their Sunday duties. This, when the demand for mental exertion is severe, and especially when there is that state of excitability of the nervous system which is frequently co-existent with a diminution of its vigor, is found to be very commonly followed by the appearance of a large quantity of the alkaline phosphates in the urine. And in cases in which constant and severe intellectual exertion has impaired the nutrition of the brain, and has consequently weakened the mental power, it is found that any premature attempt to renew the activity of its exercise causes the reappearance of the excessive phosphatic discharge, indicative of an undue waste of nervous matter."*

Take again the disease known as *spermatorrhœa* (by this term I include all those disorders which are primarily dependent on an abnormal loss of semen); it furnishes us with additional evidence that excessive waste of Phosphorus is inimical to physical and mental vigor. The spermatic fluid is rich in Phosphorus, and its emission from the system, *in whatever manner produced*, is, when *excessive*, highly injurious. The nervous centres being deprived of their proper pabulum, fall into a state of exhaustion, and the effects ultimately produced in the economy are the same as those that we see resulting from overwork and excessive mental strain. A morbid condition is set up in which a general loss of nerve-power is manifested. Definite forms of functional disorders, such as *cerebral* and *spinal paresis*, neuralgia, epi-

* Principles of Human Physiology.

lepsy, melancholia, etc., are induced, and if these are neglected, structural changes are soon developed, leading to softening, paralysis and death. It is very remarkable that the phenomena of disease present in these cases of seminal waste should so closely resemble those induced by *mental strain*, although in the former they are usually more pronounced, more exhausting, and more serious. Premature failure of mental power, loss of memory, irritability, nervousness, and extreme depression, are common to both. We conclude, therefore, that *de-phosphorized blood* is incapable of supporting the nutrition of the cerebro-spinal centres, and that functional disorders frequently result.

In relation to this subject, it may be mentioned that it is a well-known pathological fact that sexual excesses (in which nervous excitement and overwrought emotions are added to the material loss) are, for the same reason, productive of a general loss of mental and physical power, as well as of diseases affecting the organs of respiration and circulation.

"I am convinced," says Mr. Acton (whose opinion on this subject may be taken to be of some weight), "that many of the most obstinate as well as obscure diseases which the medical man meets with, arise from repeated loss; and I am no less certain that hypochondriasis, various forms of indigestion, debility, and nervous affections, arise from the same cause."

"Any warning against sexual dangers would be very incomplete if it did not extend to the excesses too often committed by *married persons*, in ignorance of their ill effects. Too frequent emissions of the life-giving fluid, and too frequent sexual excitement of the nervous system are in themselves most destructive."

The practice is certainly often continued until health is seriously impaired; and when the patient is at length compelled to seek advice, he is shocked to learn that his sufferings arise from excesses unwittingly committed.

Dr. Cotton says: "Of all vices, however, none are more apt to lead on to consumption than the unnatural or unrestrained indulgence of the sensual passions. To this cause alone the germs of tubercle are very frequently traceable; and I am convinced that the many bearings of this subject upon physical and mental energies have a much closer and more frequent relationship to phthisical affections than we can ever expect, from their peculiar nature, to see fully demonstrated."

"*Menorrhagia, diarrhœa, leucorrhœa*, and other *hæmorrhages* and fluxes, if excessive, reduce the powers of life and the capacity to resist disease. No loss of the kind, however, does so much harm, and is of so irreparable a nature, as that of the semen. In many of the lower

tribes of animals the males live till they copulate, and then die : the reproduction of the species is at the expense of the life of the individual. That our own species is not wholly exempt from this law, is apparent from the fact that immoderate venery produces extreme debility and premature decay, and predisposes body and mind to various diseases."

In 1862 Dr. Smith read a paper before the Medico-Chirurgical Society, entitled "A Statistical Inquiry into the prevalence of numerous conditions affecting the constitution in one thousand phthisical persons when in health." It is here stated that "11.6 per cent. of the males had committed sexual excesses : 18.2 per cent. had been addicted to masturbation ; and 22 per cent. had suffered from involuntary emissions."

It is unnecessary to pursue the subject further. Enough has been said to show that, as a pathological fact, excessive elimination of Phosphorus is highly detrimental to the physical stamina and mental power of the adult ; that it is also inimical to growth and development in the young, and a frequent cause of disease of the vital organs and nervous system.

The THERAPEUTIC USES OF PHOSPHORUS may be fairly gathered from what has already been stated ; nevertheless, it will be well, by way of a *résumé*, to state more definitely the several morbid conditions for which Phosphorus is known to possess remedial power.

The subjects, therefore, who benefit most from Phosphorus are those whose nervous power has been injuriously affected by : (1) EARLY INDISCRETIONS, VICIOUS and IRREGULAR HABITS ; (2) INTEMPERANCE ; (3) WORRY and OVERWORK ; (4) FAILURE IN BUSINESS or REVERSE OF FORTUNE ; (5) MENTAL STRAIN and PROLONGED ANXIETY ; (6) EXCESSIVE GRIEF, etc.

From the testimony of the authorities cited below, it will be seen that Phosphorus has a very wide application in medicine. Its therapeutic effects are mainly due to its alimentary properties, and that when employed as medicine it is appropriated *as food* in building up and renovating nerve tissue. In administering Phosphorus we are not introducing into the blood a substance foreign to its constitution, but are simply supplying one of its normal constituents, which, owing to some morbid influence, has become deficient,—it may be from excessive dis-assimilation of tissue, or an insufficient supply of the element in the animal and vegetable substances taken as food. Its physiological action in the economy then being that of renewing and strengthening brain and nerve tissue, it follows that it may be administered in

every case of nervous disorder in which we have reason to believe that the process of dis-assimilation has been unusually destructive.

Many well-known authorities agree in these views :

DR. RADCLIFFE says: "For the last seven years, also, I have used Phosphorus in the majority of cases of *chorea* in which I have used cod-liver oil, and for the same reason. I asked myself whether the fact that Phosphorus is present in large quantities in the great nerve-centres, and that the amount of this ingredient seems to have some direct relation to the activity of the nervous functions,—being as much as two per cent. in adult life, and below one per cent. in infants and idiots,—might not show that Phosphorus is specially indicated as food for a weak, nervous system, as much indicated, perhaps, as Iron in cases where there is a deficiency of red corpuscles in the blood ; and this question once put seemed to require an answer in the affirmative."*

"In proper doses," Dr. Radcliffe continues, "Phosphorus produces the very changes which are desired in cases of *chorea*, and analogous forms of convulsive disorder. Properly watched, it is quite innocent in its action, and may be most beneficial. Of this I am most confident."†

"*The chief use of Phosphorus in medicine*," says DR. WOOD, "*is as a nutrient tonic to the nervous system. In all cases of nervous exhaustion, whether involving the cerebral or spinal centres, it is of great value. I have seen marked benefit from its use when the symptoms were not severe enough to indicate organic lesion, but the most remarkable results have been in the cases in which the structure of the centres was apparently deeply implicated. In threatening cerebral softening, in myelitic paraplegia from excessive venery, it is the only drug which appears really to affect the nerve-centres. In neuralgia, attention has recently been drawn by several writers to its virtues ; and as neuralgia is often simply an expression of exhausted nerve-power, the use of Phosphorus is commended by reason as well as by experience. It is probable that it may be of some value in cases of impaired vitality, although the nervous system be not obviously implicated.*"‡

BURGESS and MAJOR, in a work "On the Therapeutic value of Drugs, as deduced from Experiments on Man and Animals," say:—

"Phosphorus is indicated in the diarrhoea of phthisis, pneumonia, in malignant jaundice, fatty heart, atheroma of the arteries, mollities

*Reynolds, *System of Medicine*, p. 220, art. CHOREA.

†Reynolds, *System of Medicine*.

‡Professor H. C. Wood, Clinical Lecturer on Diseases of the Nervous System in the University of Pennsylvania, etc.

ossium, softening of the brain and spinal cord, nephritis, in atonic conditions of the cerebro-spinal system and muscular weakness in children, irritable weakness of the sexual organs induced by excessive venery, incipient caries, purpura, functional paralysis, adynamic fevers with prostration and emaciation, hectic fever, progressive spinal paralysis, marasmus, general debility, chronic catarrh, arthritic hemicrania, broncho-pneumonia, phthisis pulmonalis in the early stage, gastro-enteritis with emaciation, ulceration, and fistulous ulcers."

PROFESSOR PERCY (S. R.) has employed it with great advantage in cases of furuncular eruptions.

"In medicinal doses," DR. HARLEY says, "Phosphorus is a *stimulant* to the nervous system, and may be given when there is a tendency to nervous prostration and general enfeeblement, as in the early stages of the palsy of the insane, and cases of cerebral or spinal atrophy."

"In small doses," says DR. PEREIRA, "Phosphorus excites the nervous, vascular, and excretory organs. It creates an agreeable feeling of warmth in the epigastrium, increases the fulness and frequency of the pulse, augments the heat of the skin, heightens the mental activity and the muscular power, and operates as a powerful sudorific and diuretic."

It has been sagely remarked that the effects of Phosphorus differ almost entirely as the dose is therapeutic or toxic. With this proposition we will not quarrel; but it may be more useful to know that, even when administered in strictly therapeutic doses, its effects vary entirely according to the amount given. The action of Phosphorus is in fact threefold: 1. NUTRITIVE; 2. TONIC; 3. STIMULATIVE. Its nutritive and tonic action is best secured in doses of from a fiftieth to a twenty-fifth of a grain; while as a stimulus to the nervous centres the dose should not be less than a twenty-fifth, and not more than a twelfth.

PHARMACEUTICAL PREPARATIONS,

OLD AND NEW.

MODE OF ADMINISTRATION.

WE now come to consider the best mode of administering this remarkable medicine. Although Phosphorus was discovered by Brandt in 1669, no formula for its internal administration appeared in the Pharmacopœia until May, 1874. It is true that several formulæ for the preparation of Phosphorus—pills and solutions—were to be found scattered about in works of *Materia Medica*; but these were all more or less defective and practically of no value, a few were peculiarly dangerous, as will be seen on reference to recipes given further on. The only formulæ bearing impress of authority were those of the Prussian Pharmacopœia (Phosphated Oil) and of the French Codex (Phosphorated Ether). Both preparations are known to be unstable, and therefore uncertain and dangerous. For other reasons they are practically objectionable, and exceedingly unpleasant to take. Moreover, it is never *necessary* to exhibit Phosphorus in a fluid form. All Solutions should be avoided. In Ether or Alcohol [tinctures] they are subject to constant *variations in strength*, owing to evaporation in the one case and to the absorption of water and partial precipitation in the other; while in Oil (especially in Cod Liver Oil) the Phosphorus is liable to oxidation, and the mixture is so exceedingly nauseous that patients are with difficulty persuaded to take a second dose.

Phosphites and Hypophosphites of Soda, Potash and Lime have been largely employed as a means of introducing Phosphorus into the system; but the results obtained by equally competent observers are very contradictory. By some they are said to be highly beneficial, by others to be almost inert. It is certain that no reliance can be placed upon the various salts. It may be asked, why should we employ feeble and uncertain compounds, when free Phosphorus is required, and can be now easily procured and safely administered?

Phosphide of Zinc has been very recently tried, and, it is said, successfully. It is thought by some practitioners to be an effective mode of administering the element. It is, however, slow in its action, and often gives rise to violent local disturbance, causing nausea and vomiting. To set the Phosphorus free, this compound must undergo decom-

position: and since it occasions quite as much digestive disturbance as solutions of Phosphorus, and possesses no advantage over them, while in point of therapeutic value it is very inferior to the pure metalloïd, there can be no reason to retain it amongst our preparations.

Red Amorphous Phosphorus.—This is an allotropic variety of the element. When pure, it contains *no free Phosphorus*. Any remedial value it may possess is due to imperfect isolation, and as this is always more or less incomplete, it should not be prescribed. If pure, its therapeutic value is nil; if impure, the amount of Phosphorus is uncertain, and may be dangerous.

It is interesting to note that the dose of this substance, as given by different therapists, is found to vary from one-sixth of a grain to ten grains.

Oleum Phosphoratum, B. P., 1874. A solution of Phosphorus in Almond Oil, 10 minims—a fifteenth of a grain of Phosphorus. Of the several fluid preparations hitherto devised, this is undoubtedly the least objectionable. It is a matter of daily experience that patients *will not* be persuaded to take more than a dose or two of any medicine that causes a sense of discomfort; and for this reason tinctures of Phosphorus are practically useless. Nausea, flatulence, eructations, and loss of appetite are symptoms always interpreted by patients, and no doubt correctly so, to indicate that the medicine taken *is indigestible*—"disagrees with the stomach." Useful remedies in this manner are often abandoned before it is possible to perfectly affect the system. When Phosphorus excites any local irritation, it is invariably due to the imperfect preparation or to a badly chosen mode of administration, and not to the metalloïd itself; where failure occurs it is to be ascribed solely to this cause. It is encouraging to know that when it is rightly prepared Phosphorus provokes no disagreeable symptoms whatever, and is incapable of producing corrosion or irritation of the mucous membrane of the stomach.

Dr. Hammond, of New York, gives the following formula for administering Phosphorized Oil:

R	Olei Phosphorat.	.	.	.	℥ ss.
	Mucil. Acaciæ.	.	.	.	℥ j.
	Ol. Bergamii.	.	.	.	gtt. xv.
	M. ft. emulsio.				Dose: gtt. xv. ter die.

Dr. Routh, who has prescribed it under the name of *Sol. Phosphori Medicati*, says:—"This is not a preparation which everybody can take. It sometimes operates very energetically as a poison, producing, even in doses of ten drops, intense sickness, temporary loss of power in the

extremities, and a deadly pallor—in fact, it cannot be tolerated in these doses by some persons. It is more prudent to begin with five drops, gradually increasing the dose one drop daily, and in this way it can be brought up often to thirty or forty minims for a dose The effect of long-continued employment of this remedy is somewhat remarkable. It seems occasionally to produce an intense burning along the intestinal tract. Patients describe it as a coal of fire within them. . . . I have usually considered 1-30th of a grain of Phosphorus quite a large enough dose to begin with, *i.e.*, about ten drops of this solution. But we should be prepared for sudden occurrence of the poisonous symptoms,—sickness, vomiting, faintness, palpitation, and temporary loss of motor power [!] This *Solutio Phosphori Medicati*, is, of all the preparations I have used, that by which these poisonous symptoms may be most readily induced.” [!]

This account certainly offers no encouragement for a further trial of *Sol. Phosphori*, and could the effects here described be traceable to the action of Phosphorus, after its assimilation, we should not be justified in using it at all; but as they are due to the partially oxidized Phosphorus acting locally upon the tissues, it is simply the method of administration and not the remedy that should be abandoned. This remark applies with equal force to all preparations of Phosphorus the administration of which is followed by any similarly distinct evidences of poisoning.

Phosphorus “Perles.” [Phosphorized oil in capsules.]—If phosphorized oil is to be administered, this preparation is the best means of doing it, but the capsule does not remove the objection to it. The capsule dissolves directly it reaches the stomach, the oil is at once set at liberty, and the membrane exposed to the partially oxidized Phosphorus, giving rise to that most disagreeable effect, the eructation of phosphorated hydrogen.

Phosphorus in Pill Form.—Ashburton Thompson tells us that Kunkel gave free Phosphorus in the form of “luminous pills” before 1721, but his process for making them was not published, and died with him. Leroy, in 1798, believed that he had re-discovered Kunkel’s method, and he entrusted their manufacture according to it to Charles le Pelletier, a brother of the celebrated Bertrand le Pelletier. But Leroy was so impressed with the danger of giving *unequally divided* Phosphorus, and the mode of preparation in question was so difficult to carry out, that he declined to confide it to any other person.

Many attempts have been made to make pills from a solution of Phosphorus. Mandl has given an example; other persons have also furnished formulæ from time to time, and all have signally failed.

In a recent article on the value of Phosphorus in Medicine, which appeared in "*The Doctor*," the following reference is made to formulæ for the preparation of Phosphorus pills, still to be found in text-books.

"Before closing, we are bound to advert to some published formulæ worthy to be spoken of as curiosities of pharmacy, except for the fact that some are dangerous. They pass from one book to another unchallenged and without comment, and authors who we should have thought better informed on the pharmacy of Phosphorus have quoted them, though with what purpose, as they are practically useless, it is difficult to divine. Why perpetuate obsolete prescriptions which are likely to do harm? We have met with some of these in which directions impossible to follow are given. Thus as late as 1873 we actually find this credited to Burgess, in a work on skin diseases :—

Phosphorus, g. iij. to xx.
Almond oil, gtt. x. to lx.
Powdered acacia, q. s.

Make twelve pills.

Dose: one twice a day. Use in lupus and syphilitic tubercular disease.

"How many persons have been poisoned by this it may be difficult to say. Perhaps the difficulty of dispensing the prescription may have saved some lives, but we are astonished beyond measure to find a careful teacher admitting into his work a formula which is too defective to attempt to prepare. If by some means ten or twenty grains of it was got into twelve pills, most assuredly the person who took them would be *poisoned*. Twenty grains of phosphorus in twelve pills!!

"A very similar formula was for many years a standing dish in Hooper's '*Physician's Vade Mecum*.'* In the last edition we are glad to see it omitted. With such formulæ floating about, we cannot be surprised that phosphorus acquired the reputation of being a violent irritant poison; but during the last few years it has been given right and left, and is taken just like any other tonic, and we hear nothing of poisoning except in a few solitary cases *in which it has been clearly proved that the dose was excessive or its preparation defective*.

*R. Phosphori gr. iij.
Ol: caryophylli, ℥. xij.
Pulv. glycyrrhizæ q. s.

Divide into twelve pills, and give one, twice a day, *cautiously increasing the number*.

This pill is recommended "in lupus, obstinate scaly diseases, and syphilitic tubercles."

"Nothing can be easier than to make powdered phosphorus into pills, and it is to be feared that most of the pills in the market are of this sort. Hence they are uncertain, and consequently dangerous. Other specimens are so hard and insoluble, that as in those of the Pharmacopœia, the absorption of the dose is altogether conjectural."

It can answer no useful purpose to discuss further these defective, and let us hope now obsolete, formulæ.

The profession and the public, however, cannot be too careful in avoiding these dangerous compounds.

None of the preparations referred to (and they are the only ones which have any claim to remedial utility) answer the end in view satisfactorily; some of them are uncertain in their action, while others are most objectionable because they invariably give rise to local disturbance, and disorder of the digestive functions. What is really wanted is a preparation which shall hold the PHOSPHORUS IN THE FINEST STATE OF SUBDIVISION, HIGHLY DILUTED and CHEMICALLY UNCHANGED; the object of primary importance being to convey the Phosphorus into the blood unoxidized, without irritating the tissues with which it must necessarily be brought into contact. It is a clinical fact, based upon large experience, that the remedial value of Phosphorus depends wholly upon its assimilation *before, and not after, its conversion* into Phosphoric Acid or other Phosphorus compound.*

The advantages of administering Phosphorus in this form are sufficiently obvious, and may be thus summarized:—1. The Phosphorus is virtually retained in a state of solution. 2. It is so treated that it excites no local irritation. 3. As the disintegration of the pill necessarily occurs gradually, the Phosphorus becomes incorporated with the food; and is conveyed slowly into the circulation by assimilative process.

*NOTE—*The Phosphorus pills of WM. R. WARNER & CO. meet this want and give complete and satisfactory results. The ELEMENT IS IN A PERFECT STATE OF SUBDIVISION; IT IS THOROUGHLY INCORPORATED WITH THE EXCIPIENTS WHILE IN SOLUTION, AND IS SUGAR-COATED WHILE IN A SOFT MASS, thus insuring ACCURACY, RELIABILITY and PROTECTION from the OXIDATION, which occurs in other preparations of this material. The pills have been in constant use for nearly eight years; they have been subjected to every test—chemical as well as therapeutical—that could be applied to them; and have proved, not only to be thoroughly effective, but free from all toxic properties. It is therefore not too much to say that all the difficulties which so long beset the administration of Phosphorus are entirely removed by this process.*

It is quite possible that solution of the pill is not completed before it reaches the duodenum, or it may be on its passage through the small intestines. The pills, in fact, may be regarded simply as convenient *carriers* of free Phosphorus (in a highly diluted state) to the absorbents, where it is rapidly taken up and becomes a constituent of the living body without disturbing any of its functions. It is in this way alone that Phosphorus exhibits its full remedial power, and it is satisfactory to know that it is easily effected, without even incurring the *risk* of inducing those symptoms of poisoning which are of so frequent occurrence when Phosphorus is administered dissolved in oil or alcohol.

For its preparation *Pil. Phosphori* requires skilled and very careful manipulation; the process employed is too complex and far too difficult to be undertaken without practical instruction and a properly constructed apparatus which it necessitates. It cannot, therefore, be prepared extemporaneously by the chemist, as other pill masses commonly are.

The success which has attended its administration, we believe to be due not only to the peculiarly attenuated form in which the Phosphorus is held and the readiness with which it is assimilated, but also to the unremitting care taken to prevent failures by reason of unskilful manipulation. Had these precautions not been taken, not only failure but accidents would have undoubtedly occurred, and the reputation of the drug would have suffered much, but most unfairly; doubt and suspicion would have still surrounded the therapeutic value of an exceedingly useful remedy, which has no substitute in medicine.

The physician may therefore have no hesitancy in prescribing this pill. In the Formulary will be found several useful combinations which may be obtained already prepared. Most of these have been very largely used, and found exceedingly useful for the treatment of the diseases for which they are recommended.

A COURSE OF PHOSPHORUS.

It is now known that it is not only safe to continue Phosphorus for many months, but that in chronic cases it is necessary to do so in order to produce its full remedial effect. Relief may and frequently is very speedily obtained; but in cases of long-standing disease, depending upon structural change, and exhibiting a material loss of power, permanent benefit cannot be expected from a few doses. The cure will depend upon the persistent use of the remedy in small doses

until its physiological action is well secured. To this end the dose should be taken not less than three times a day (ALWAYS WITH A MEAL), for a period of six or eight weeks, or until about four or six grains have been administered: then it may be suspended for a few days, and again resumed for another six weeks, and with a like intermission continued for six or eight months, the patient of course being under professional observation. In LOCOMOTOR ATAXY, Pil. Phosphori 1-50 gr., and Pil. Phosphori et Nuc. Vomicae have been resorted to continuously for twelve months with excellent results, and without giving rise to a single unpleasant symptom.

DOSE OF PHOSPHORUS.

The dose of Phosphorus is variously stated by different authorities. As its therapeutic action, and therefore its efficacy greatly depends upon the amount given, it is a matter of considerable importance, and should in every case be carefully determined. The dose given by Prof. Stillé is one-twentieth to one-fourth of a grain; by Dr. Garrod one fortieth to one-twentieth of a grain. The twenty-fifth grain, we believe, is the *maximum* dose, and one that cannot be increased without some risk of incurring disagreeable consequences. Dr. J. C. Wood, who has had large experience in the use of Phosphorus, thinks that in *therapeutic doses* its physiological action is entirely different from that which it exerts when given in larger quantities. He says: "Like Iron, Cod-Liver Oil, etc., it appears to act, when given in minute doses, as a stimulant to the nutrition of the tissues into whose composition it enters;" as this is precisely the manner in which we desire it to act, *large doses should not be given*, and no attempt should be made to impress the system suddenly. In exceptional cases it may be desirable to administer full doses as a stimulant to the nervous system.

Experience enables me to say confidently, that for all purposes it will be found safer and more efficacious to give small doses repeatedly (every four or five hours, and in exceptional cases every two) than to *surprise*, as it were, the system by large doses. The fiftieth of a grain is a medium and perfectly safe dose, and one that is most generally prescribed; a twenty-fifth of a grain is a safe dose, but being of course proportionately more active, the effect of such doses is STIMULATION, and requires watching; they are only necessary in cases where the stimulant action of the element is indicated. In NEURALGIA, Phosphorus is almost a specific; full doses are necessary and generally well borne. The Pil. Phosphori, gr. 1-50, one or two may be taken an hour before an expected paroxysm, and be repeated three or four times a day. It

is a wise rule, however, not to exceed an eighth of a grain of Phosphorus in the twenty-four hours.

CONTRA-INDICATIONS.

Phosphorus is contra-indicated in active *congestion of the brain*, and generally in *plethoric states of the system*, and it should not be given to persons inclined to hæmorrhage. The fact cannot be too often repeated, that the drug in moderate doses acts as a *nutrient* when it cannot be borne as a *stimulant*, and may exert some devitalizing action; and in doubtful cases small doses only should be given; in *anæmia* always with iron.

PHOSPHORUS
IN
FUNCTIONAL DISORDERS
OF THE
NERVOUS SYSTEM.
(LOSS OF NERVE-POWER; OVERWORK.)

IN these high-pressure times prostration from loss of nerve-power is a very common disease; it is, in fact, *the* "complaint" of modern life. It prevails more or less in all classes of the community; but it is most frequently found among those engaged in professional, scientific, and literary pursuits, and those engrossed in commerce or by mercantile or financial speculations. It is constantly met with also in what is called *fashionable life*, and amongst those having nothing to do, as well as those who live in an atmosphere of perpetual nervous excitement and pleasure-seeking, involving incessant activity of *heart* and brain. Growing boys and girls, students and scholars, whose mental powers are unduly stimulated and spurred into action by keen competitive struggles, are also frequent subjects of this complaint.

"Of all the parts which go to make up the wonderful whole of the human body," says Dr. Hadfield Jones, "there is none to which a deeper and more mysterious interest is attached than to the nervous system. By this we think and move and have our conscious being; in this, if anywhere, inhabits our '*divinæ particula auræ*,' by this we are linked with the outer world, and are capable of affecting and being again affected by the persons and things around us. By this our immaterial acts upon, and sways, our material part; and by the higher development of this, and its capability for higher actions, man is especially distinguished from the lower creation. All the passions and emotions, all the intellectual efforts, all the perceptions and recollections operate through and on this system. If this be so, is it any wonder that exhaustion should frequently befall this delicate and complex machinery, or that its disorders should be among the most frequent that our fallen nature is doomed to bear? Even under favorable circumstances the nervous system must often be severely taxed; how much more then will this be the case when sorrow, toil, and anxiety predominate in the lot assigned

OVERWORK and FAST LIVING are the principal factors inducing Loss of Nerve-Power (we do not mean living fast in the sense it is commonly employed, although dissipation and excesses of all kinds are, without doubt, a frequent cause of diminished power), and we refer particularly to the now universal custom of *living in a hurry*, amongst scenes of constant and multifarious excitement, and which are the salient characteristics of the age.

The destructive tendencies of *life at high pressure*, and the manner in which it induces disease is graphically described in the following passages of Mr. W. R. Greg's lecture on "*Life at High Pressure*."

"The physical consequences of this needless hurry are grave enough; the moral consequences are, possibly, graver still; though both sets of effects are as yet only in their infancy, and will take a generation or two fully to develop.

"The rapidity of railway travelling *produces a chronic disturbance in the nervous system; and the anxiety to be in time, the hurrying pace, cause a daily wear and tear, as well as accelerated action of the heart, which kills or injures thousands.* The constitutions which are thus enfeebled and impaired we transmit damaged to our children, who add to and pass on the sad inheritance. Heart disease, too common already, may be expected to be more common still. We are, perhaps, most of us, conscious at some time of the need to be quiet and alone, but few of us have estimated adequately the degree in which an atmosphere of excitement, especially when we enter it young and continue in it habitually, is fatal to the higher and deeper life; the subtle poison which it disseminates throughout the whole character; how it saps solidity and strength of mind; how it daily becomes more necessary and in increasing measure; how it enfeebles and renders abnormally sensitive the subtle organization of the brain; and how far, by slow and sure gradations, it carries us on towards a mental and moral condition which may justly be pronounced unsound. But 'high pressure' is shown even more in our style of work than in our rate of movement. The world is more exacting in its demands from all laborers, except merely manual ones. Success in professional, public, and commercial life demands more strenuous and exhausting toil, sterner concentration, and a more harsh and rigid sacrifice of the amenities which time offers the easy-going than was formerly the case. The eminent lawyer, the physician in full practice, the minister and the politician who aspires to be a minister, even the literary workman and eager man of science, are now condemned to an amount and severity of exertion, which forces one after another to break off (or to break down) in mid-career, shattered, paralysed, reduced to premature inaction or senility.

What work does for the learned professions, anxiety does for the merchant and the manufacturer. The barrister must make hay while the sun shines, for it shines so late; the physician cannot, in middle life, select among the patients whom he has longed for through the years of youth; while the statesman has to undergo a prolonged pressure to attain what Macaulay calls 'that closely-watched slavery which is dignified with the name of power.' Men who have given up their entire being to this business-labor often lose all capability of a better life, all relish for recreation or contemplation, all true appreciation of leisure when it comes at last; for the faculties of enjoyment, like all others, are apt to grow atrophied with disuse. The successful man too often, with much to retire upon, has nothing to retire to; for literature, science, domestic ties, public and philanthropic interests, nature itself, have been lost sight of during the mad struggle, and these are treasures the key to which soon grows rusty. This ceaselessness and severity of toil gives the prizes of life to men of exceptional physique."

This to many may appear a startling and overdrawn picture of the battle of human life; but truth and experience compel us to admit it to be a faithful one.

Physicians know full well the sacrifices that *are made* at the shrine of mammon, and of the many who are compelled to retire from the struggle physically, and too often morally, ruined before middle age is attained.

"*Much to retire upon, nothing to retire to!*" What a biting satire. When the goal *is* reached, is it worth the cost?

Yet this *unnatural* life of struggle, unrest, and of perpetual excitement and effort, with all its perils and forfeitures, has become, either from choice or necessity, the normal state in which we live; for by an irresistible force of circumstances it is thrust, *volens volens*, even upon those who would if they could escape it.

Under these unwholesome conditions, is it a matter of surprise that the most prevalent diseases are those which are directly induced by mental and physical overstrain; that brain and heart disease, and loss of nervous power, are the common complaints of modern life?

Besides the two great factors mentioned,—overwork and fast living,—there are other *causes* which tend towards nervous depression or loss of nerve-force; the most detrimental is probably defective hygiene, living in low and damp situations, in close and confined neighborhoods, in houses ill-constructed affording but a scanty supply of fresh air and sunlight, to which perhaps are added bad drainage and defective ventilation. Unwholesome conditions of the kind exist in all large and crowded cities, and then the very atmosphere is more or less devital-

ized. The blood of human beings surrounded by these influences becomes impoverished and imperfectly decarbonized, the nutritive processes are imperfectly performed, secretion and excretion interfered with, and vitality is at its lowest. It must be manifest that should defective sanitary arrangements be superadded to overwork, as in many cases they will be, the nervous system is more rapidly lowered in tone. It is under these circumstances that overwork provokes intemperance, that recourse is so frequently had to alcoholic stimulants to spur the flagging energies of failing heart and nerve,—*alas!* a practice far too common, and one of the worst features of “*life at high pressure*,” sustained under the conditions which we have described. A man may be perfectly sure that if his work cannot be done without a constant recourse to alcoholic stimulants in any form, he will not be able to go on long and accomplish more with its aid; artificial stimulants do but hasten and render more inevitable the final collapse. Even constitutions commonly called “*fine*” cannot long resist the additional evils engendered by “*taking to drink*.”

A well-known fact may here be mentioned, since it is an example of the potency of these influences, viz., that acute diseases, fevers and inflammation (especially when these occur in large and crowded neighborhoods)—which were formerly treated successfully by the lancet and other depletory measures, now assume a low adynamic type, and yield only to an opposite plan of treatment—tonics, support, and stimulation.

Moreover, it would not be difficult to show that many functional derangements with which the physician has to deal,—affecting the action of heart, liver, and stomach,—and which bear a variety of *names*, are almost wholly due to a deficiency of power in the organic nervous system.

“It is difficult to form a decided opinion on the matter; but there seems, I think, reason to entertain the belief that failure of nervous power is much more characteristic of disease of the present day, than of that which prevailed forty years ago. For this there may be various causes: the greater confinement of large numbers of the population within doors, and often in unhealthy rooms or workshops; the harder struggle to be maintained in the battle of life, the greater amount of the *commoda vite*—may all tend to increase the susceptibility of the nervous system, and to impair its resisting power. However the exact truth may be, whether the type of disease is altered or not, I hold it to be abundantly clear that the great majority of disorders we have to treat at the present time show more or less marked indications of failure of nervous

power; and I believe it to be a matter of great practical moment to keep this steadily in view."

How, it may be asked, is a man to know when he is living too fast? When his work, be it mental or physical, or both, is injurious? How is he to ascertain that he is overworked? The answer we think is, when the daily routine of duty is followed by fatigue which is *not removed by repose*; by errors and omissions creeping into his work; when forgetfulness becomes frequent, and the affairs of the day pursue him at night; when the mind is busied and his rest disturbed by the occupations and the cares of business; and when, after restless sleep, he awakes to resume the duties of the day unrefreshed. *Wakefulness* is always a suspicious symptom; a man who works hard should sleep soundly, and if sleep is absent it is highly probable that the circulation through the brain is abnormally active.

Constitution (Diathesis), sex, age and idiosyncrasy, exercise controlling influences in determining *the form in which loss of power is expressed*. These various conditions also increase or lessen the gravity of its consequence, but they have all, therefore, to be taken into account in making a prognosis and in deciding upon treatment. The following symptoms, or some of them, are always present:—

Wakefulness, and a sense of depression in the chest, "a sinking, empty feeling," amounting sometimes to physical pain; this is usually the first to attract the notice of the patient. Mental power is impaired and less retentive. The mind is *spiritless* and *depressed* with *gloomy forebodings of evil*; success in life earnestly sought after, and hardly worked for, is now despaired of. Habitually taciturn and irritable, the patient seeks to be alone and shuns all society. The heart acts irregularly, the pulses beat feebly, and too rapidly, the digestive process is imperfectly performed; nutrition is arrested, the muscles waste, color fades, and a condition of nervous inervation, technically known as paresis, is established, sometimes involving the cerebral hemispheres, sometimes the upper portion of the spinal column, but not unfrequently involving all the nervous centres.

IMPOTENCE.—"This is a term," says Mr. Acton, "given to *al* those morbid conditions which are opposed to the physiological union of the two sexes." The subject cannot, therefore, be discussed at length here, nor indeed, would it be alluded to, except that it is often symptomatic of a grave, "morbid condition" of the nervous centres, and we take cognizance of it only because it is intimately associated with our subject.

In estimating the significance of Impotence as a symptom, it is

necessary to bear in mind that the sexual instinct is not physiologically developed in all men and women alike, but rather in an unequal degree,—in some it is strongly developed, and in others feebly so. Great natural differences exist in this respect, and are quite consistent with perfect *health*. But extremes of both kinds are abnormal, and result from nervous derangement. They frequently lead to disease, and for that reason demand medical treatment.

The sexual instinct is under the control of the nervous system, and it is observed that indifference, and it may be entire absence of desire, and sexual incapacity, or perversity of sexual feeling, are, each and all, the concomitants of certain depressed or morbidly excited conditions of the nerve centres, which have already been fully discussed. But persistent impotence is not in any case to be assumed. This fact should be more generally known, because it is a state which may alarm and depress some minds exceedingly. Nervous persons are often tormented by fears of sexual incapacity; in some cases this fear may amount to a monomania.

Temporary incapacity yields usually to appropriate treatment directed to exalt the tone of the nervous system, and requires nothing special. Phosphorus, Nux Vomica, and Strychnia are the most useful remedies. Electricity—Faradisation and the continuous current—is also a useful agent. But neither the one nor the other, without judicious general treatment, can be relied upon.

Dr. Wm. Mason Turner reports the following cases :

IMPOTENCE.—Mr. O. H., of Arkansas, aged forty-five, hale, married, likewise consulted me by letter, giving a full history of his ailment. Much disturbed concerning his condition. Put him on Phosphorus and Nux Vomica, with customary directions concerning exercise, diet and animal indulgences. Some two months or more elapsed, when I heard a favorable report from him. Heard from him again; he frankly admitted that, in the meantime, he had been indulging too freely in strong drink.

IMPOTENCE AND SPERMATORRHOEA.—Was written to by Mr. ———, then living in Illinois, now in Denver, Colorado—evidently a young man of refinement and culture. Had been in London for several years, where he indulged to excess in sexual pleasures. The result was that his virility was soon so much impaired that he could never consummate coitus. He had spermatorrhœa also, due, doubtless, to an enlarged and irritable prostate. As he contemplated marriage, he was naturally solicitous about his case. I put him on the treatment similar to that given in the above case; only I alternated the phosphorus and nux vomica pill, with the simple phosphorus pill (1-100 gr.) He was loth to admit any improvement whatsoever, but finally did so, and to a sufficient extent to encourage me in the continued use of phosphorus.

NERVOUS INDIGESTION.—Described under various appellations—*atonic dyspepsia*, *neuroses of the stomach*, etc., is one of the commonest manifestations of loss of nerve-power,—and if the acute forms of indigestion arising from improper food and the abuse of alcohol be excluded,—it is perhaps the commonest of all forms of dyspepsia.

The processes of digestion and of assimilation are almost wholly under the influence of the nerves of organic life, and when from any cause these centres of nervous force are enfeebled, want of tone is at once manifested by all the important functions involved. It is within the experience not only of doctors, but of all classes of brain-workers, as well as those actively engaged in business and exposed to the worries and anxieties thereby entailed, that the digestion is greatly influenced by the state of the mind at the time when food is taken. That digestive power is liable to be lowered by sudden emotions and passions there can be no doubt. The natural secretions are sometimes suddenly interrupted and digestion delayed or wholly arrested, leading to nausea and the rejection of the food taken. Habitual overwork and anxiety exercise a continuously depressing influence on the nervous centres; hence it is that indigestion, expressive of a want of nervous power, is the bane of professional life. The treatment necessitates,—

1st. The removal of the cause, when that be practicable. The history of the case generally discloses some errors in the mode of life which may be corrected.

2ndly. The discontinuance of injurious habits and all practices that tend to depress nervous force. Laborious or excessive mental work should be lightened and relieved as far as possible from difficulties and anxieties. Wholesome open-air physical exercise should be increased. Long railway journeys to and from business discontinued. The perpetual hurrying to and from the stations, and the constantly recurring anxiety to catch the train, are *self-imposed* injuries. These may certainly be removed for a time at least. The increasing prevalence of heart disease is, I believe, attributable very much to these causes.

3rdly. The diet should be carefully regulated, but in this matter the experience of the patient should always be consulted.

Simple Phosphorus, Phosphorus and Nux Vomica, with and without Aloes, are the most useful medicines.

GOUT AND GOUTY AFFECTIONS.—It is beyond doubt that excessive mental labor and, *ceteris paribus*, when this is conjoined with a sedentary life, favors the development of gout. In like manner sudden grief, fear, fits of anger, and other depressing passions, frequently excite *attacks* in those predisposed to it. Venereal excesses sometimes operate in the same manner, and favor the production of the disease.

It is important to bear this in mind, because from a gouty condition of blood—a uric acid diathesis—many troubles arise. Dyspepsia, gravel, calculus; affections of the skin, psoriasis, eczema, as well as headache, neuralgia, sciatica, epilepsy; these, and other affections closely associated with the gouty diathesis, are, in many cases, primarily developed by a lowered tone of the nervous system, which is induced by overwork and high pressure.

A very interesting clinical fact may here be mentioned which has an important bearing in the treatment of these affections, it is this—that Phosphorus acts as a solvent for uric acid. It has been observed that patients who habitually pass uric acid in its crystallized form get rid of the gravel; whilst taking Phosphorus “the gravel” in all cases disappears. To this fact is probably due the alleviation of the rheumatic and neuralgic pains which follow its employment; and, at the same time, the disappearance of dyspeptic symptoms, induced by the presence of uric acid. Whether this is accomplished by the diuretic effect of the Phosphorus increasing the *quantity of water*, or by any special solvent action of its own, I am not prepared to say; but, from personal observation, I can speak positively as to the fact.

Dr. Buckler, of Baltimore, was the first to recommend Phosphate of Ammonia as a remedy for gout, and Dr. Garrod and others have used it with success. It is considered to possess great solvent power for the urate of soda. It is probable that free Phosphorus possesses a like power.

MELANCHOLIA, OR EMOTIONAL INSANITY.—This form of dementia is without doubt one that may be properly classed among induced diseases incidental to modern life. It is often caused by over brain action, and a combination of the very causes which we have already seen produces the milder forms of loss of nerve-power and physical debility.

Dr. S. W. D. Williams, Medical Superintendent of the Sussex Lunatic Asylum, publishes the following cases treated in the asylum; and as they are illustrative cases and offer invaluable testimony to the remedial action of Phosphorus, his report is appended *verbatim*:

CASE 1.—J. F., male, æt. 51 years, married, agricultural laborer. Admitted 6th September, 1873. No hereditary taint, but father given to drinking; first attack; has been gradually coming on for twelve months; supposed to be caused by dismissal from employ by a master with whom he had worked for many years. On admission, he was in a state of pure melancholia, apparently uncomplicated with delusion. His state of wretchedness and misery was pitiable in the extreme, and he was constantly on the look-out for some means

of destroying himself. His bodily health was fairly good. His nights were almost entirely sleepless, and he was treated after admission with chloral. This gave him temporary relief, but he became worse again, and on the 27th September the chloral was changed for opium and chloric ether; after which he began to refuse his food; and on November 12th, being no better, he was ordered 1-30 gr. Phosphorus, night and morning. Within a few days the depression became much less, and by December 12th had quite left him.

Result—Recovery.

CASE 2.—J. B., female, æt. 30 years, single. Admitted 6th June, 1873, when she is described as having a restless manner, and constantly wandering about day and night; as having great lowness of spirits without any apparent cause; and as expressing herself as being fearful she shall destroy herself to escape from her misery, although she is unable to assign any cause for her dejection. Menstruation regular; bodily health fairly good. Was treated chloric ether and opium, and with chloral. The attack lasted seventy days, and on August 17th she was reported as recovered. On August 28th, she relapsed, and remained ill nearly as long, but by November 27th was considered well enough to be brought before the committee for discharge. The excitement attendant on the prospect of regaining her liberty was too much for her, and she relapsed before she could be removed from the asylum. She was now put on Phosphorus, and the attack lasted only twenty-seven days, since when (two months) she has remained cheerful and well.

Result—Recovery.

CASE 3.—M. O., female, æt. 27 years. Admitted February 7th, 1874. This is the first attack, and has lasted only ten days, and is stated to be due to excessive attention to her religious duties. On admission she was in a state of religious exaltation, and had delusions on religious subjects, but in the course of a day or two she became very depressed, and slept but little at night. Chloral gave her rest for a night or two, but soon lost its effect, and opium was tried without benefit; indeed, she seemed to be lapsing into a state of melancholia atonita. On the 17th, Phosphorus was ordered; on the 22d, she was much improved, and the tongue had the silvery white appearance already described as due to this medicine. This case is still under treatment, and there is every prospect of recovery.

Result—Probable Recovery.

NEURALGIA.—This affection, when not directly the result of some physical cause interfering with the integrity of the nerve in which the pain is situated, is almost invariably due to a depressed state of the nervous system. Its very existence must be received as an evidence of deficient physical stamina, and that the nervous system is *not duly nourished*. The remote factor may be *malaria, syphilis, rheumatism, gout*, or some other cause capable of *devitalizing* the organism, and as a consequence that of the *nerves* (HAMMOND).*

* *Diseases of the Nervous System*, page 833.

This being so, it follows that our remedial measures should be directed principally to improving the nutrition of the affected nerve, and to the removal of any constitutional taint that may be present.

The first indication is best fulfilled by simple Phosphorus in large doses, or Phosphorized Iron. In FACIAL NEURALGIA and *brow ague* it should be combined with Quinine, and if malarial influence be suspected, full doses of Quinine are desirable. The treatment of SCIATIC NEURALGIA (SCIATICA) will mainly depend upon the cause. Local irritation, when detected, must be, if practicable, carefully treated. The constitutional measures employed are, however, of the utmost importance, and must be conducted on the principles already described. Phosphorized Iron, with Nux Vomica, acts most beneficially. If syphilitic taint be suspected, Iodide of Potash must on no account be omitted.

THE following table is taken from a valuable paper contributed to the "*London Practitioner*," by PROF. J. ASHBURTON THOMPSON, on the use of Phosphorus for the above-named complaint, larger doses being employed by him (the 1-25 gr.), and with marvelous success. He records 18 cases, as will be seen by table below, and arranges them in three classes—Acute Primary Attacks, Acute Recurrent Attacks, and Chronic cases. Six cases occur in each class. In the first class the ages ranged between 25 and 46; in the second, between 30 and 40; in the third, between 24 and 40.

Some of the patients suffered from Trigeminal, some from Cervico-Occipital, some from Cervico-Brachial Neuralgia, and one in the second class from Sciatica. All the cases in the first classes were cured; of the third class three were cured, one of the patients having been afflicted 16 years, without a week's freedom from pain.

Sex.	Age.	Nerves Affected.	Duration of Attack.	Extreme Duration of Treatment.	Complication.	Result.
PRIMARY ACUTE CASES.						
M	40	R. Trigeminal.	4 days.	4 days.	Catarrh.	Recovery.
F	26	L. Trigeminal.	14 days.	10 days.	Anæmia.	"
F	25	"	21 days.	24 hours.	None.	"
M	46	Cervico-Occipital.	12 hours.	12 hours.	General Derangement.	"
F	28	L. Trigeminal.	14 days.	48 hours.	Lactation.	"
F	26	"	6 days.	12 days.	Catarrh.	"
RECURRENT ACUTE CASES.						
F	40	R. Sciatic.	15 days.	36 hours.	Decay of Nature.	Recovery.
F	33	L. Trigeminal.	5 days.	6 days.	None.	"
F	32	"	21 days.	24 hours.	"	"
F	35	R. Trigeminal.	10 days.	4 days.	Lactation.	"
F	30	"	14 days.	5 days.	Phthisis.	"
F	30	"	7 days.	46 hours.	Debility.	"
CHRONIC CASES.						
F	28	{ R. & L. Trigeminal. }	18 mos.	5 weeks.	Phthisis.	Relief.
		{ Cervico-Brachial. }				
F	24	{ R. & L. Trigeminal. }	4 weeks.	9 days.	"	"
		{ Occipital, R. & L. }				
M	35	{ Trigeminal }	12 mos.	13 days.	Nervous Debility.	Cure.
F	6	{ Cervico-Brachial. }	2 mos.	14 days.	Pregnancy.	"
F	26	{ R. & L. Trigeminal. }	16 years.	18 days.	None.	"
F	40	{ R. Trigeminal }	4 mos.	15 days.	" (Decayed Teeth.)	None

Neuralgia in men is frequently simply an expression of loss of nerve-power; it may be the consequence of dissipation and excesses of various kinds,—but overwork and intense intellectual exertion also produce the disease. It is of little moment where the pain is located, the treatment must be general. Phosphorus and Nux Vomica, with or without Quinine, are remedies which seldom fail to give relief.

Women suffer more frequently and intensely from neuralgia than men do; and it is usually associated with diseases of menstruation,—menorrhagia, especially. Hyperfecundation, rapid child-bearing, frequent miscarriage, hæmorrhage, prolonged lactation, and changes occurring at the climateric period of life, induce a neuralgic condition of the nerves. In all cases the general treatment should be directed to the removal of the cause, whenever this is possible. Local treatment should not be neglected. Opium and Aconite are powerful palliatives. The best form of applying the former is by hypodermic injection; the *sixth* of a grain of the *Sulphate of Morphia* will usually succeed in arresting very speedily a severe paroxysm of pain: the latter by means of the liniment or strong tincture applied externally.

A full, nutritious diet, with a fair allowance of wine, is a necessary part of the treatment in almost all forms of Neuralgia.

TEMPORARY NERVOUS EXHAUSTION.—Whenever the system is temporarily jaded by overwork, wearied by unusual or excessive mental effort, or suffering under exceptional nervous exhaustion from any cause, Phosphorus will be found a useful remedy. In such cases its exhilarating and restorative effect is very marked. The one-twentieth or one-sixteenth of a grain may be given either alone or, combined with Nux Vomica or Quinine, with meals. It quickly produces a remarkable sensation of *bien-être*, of comfort and exhilaration, and a manifest *increase of power*. It gives to the weary and languid brain not merely a fillip, but material support, with increased capacity for renewed exertion, while it restores the animal spirits. The specific effect of Phosphorus is far less evanescent than wine and alcoholic stimulants, and it is not followed by depression common to them. It is well to remember that the employment of the remedy is open to abuse. The prescriber should be careful to see that this is guarded against.

DR. JANNEY reports as follows:—My nephew, a young man aged nineteen years, native of Bucks County, Pennsylvania, and a student at Swarthmore College, up to October, 1874, was very robust and healthy. Presented himself with the following symptoms: Emaciated, terrible headache, loss of memory, languor and low spirits. Treated him at once with **Warner & Co's Compound Phosphorus Pills**. On

the 15th of November, after four weeks treatment, his mother reported him well, memory restored, and he once more at his studies.

NERVOUS PROSTRATION occurs in the later stages of typhus and typhoid fevers, pneumonia, and other asthenic conditions. Phosphorus may thus be prescribed as a special nerve stimulant, as well as a renovator of nerve tissue, with successful results. Full doses are always necessary, Pil. Phosphori, 1-50 gr., should be ordered every three or four hours, of course watching closely its effect. In these cases it must be given boldly, and must not be delayed until it is too late to save the patient from his impending fate. The Ethereal Tinctures are recommended by some practitioners, but it is preferable, in all cases, to effect the gradual and certain absorption of the element, and this is best secured by the administration of the Pil. Phosphori, rather than by depressing the patient with nauseating doses of solutions of Phosphorus.

When it is wished *to obtain the stimulating effect of the remedy, and that quickly*, the pill should be dissolved in a little warm water (a wine-glassful) before it is taken. No better mode can be adopted, whenever it is thought desirable or *necessary* to give Phosphorus in a fluid form.

HYSTERIA.—“The hysteric state,” says Dr. Russell Reynolds, “is essentially one of mental perturbation, and it is brought into existence, if not inherited, by those conditions which are most active in producing disorder of the mind: in the male sex by worry, anxiety, overwork, late hours, accidental injuries, and dissipation; in the female sex by vexatious emotions, want of sympathy or success, disappointed or concealed affection, want of occupation, fear, and morbid conditions or supposed morbid conditions of the reproductive system.*
 It would appear that the nutrition of the whole nervous system is changed, but that change is of such a kind that it passes beyond our power of recognition, except in its physiological or pathological effects. We cannot see degeneration of tissue here or too rapid metamorphosis there, but we can witness the effects of such morbid processes in movement in secretion and nutrition, and we observe some of the ultimate results of such changes in emotion and sensation.”

Inasmuch, therefore, that, in its multiform manifestations, *hysteria* is a direct expression of exhausted vital power, Phosphorus may usually be employed with much advantage. It is best administered in combi-

* *System of Medicine*, vol. ii., p. 98.

nation with Zinc and Aloes; or if there be *anæmia*, with Iron and Quinine.

The moral treatment of hysteria is obviously of great importance. The form that it should take will depend entirely upon the causes to which the affection may be due, a remark that applies to all cases associated with loss of *self-control*, as well as defective nervous power.

EPILEPSY AND EPILEPTIC VERTIGO.—“There are two distinct elements to be regarded in the therapeutics of epilepsy. The one is the *diminution or removal of the condition which is the essential element of the disease*; and the other is the mitigation of the paroxysmal symptoms (REYNOLDS).* The treatment of this, like other affections of the cerebro-spinal system, chiefly depends upon the origin and cause of the seizure.

In one hundred and two cases treated by Dr. Hammond,† in which evidence was received, the epilepsy originated from the following causes :—

Over mental exertion	17
Venereal excesses	15
Menstrual derangement	10
Anxiety and grief	10
Indigestion	11
Dentition	11

The remaining twenty-eight originated in frights, blows, sunstrokes, fever, etc.

It will be observed that a very large proportion of the ASCERTAINED CAUSES were precisely those which lead to deterioration of nervous tissues, and in these cases Phosphorus will be found extremely useful by diminishing or removing “the essential elements” of the disease.

In the treatment of epilepsy, is usually employed Phosphorus in combination with Zinc; the attacks become less frequent and less severe as the patient comes fully under the influence of the medicine. In chronic cases even small signs of improvement should encourage us to persevere with the remedy for *six or eight months* at least.

VERTIGO and HEADACHE are symptoms of *cerebral anæmia* as well as *hyperanæmia*, and when so caused they are relieved by Phosphorus and Iron.

Giddiness and persistent headache should never be neglected; they

* *System of Medicine*, vol. ii.

† *Diseases of the Nervous System*, p. 575.

are often the earliest symptoms of an impending epileptic or paralytic seizure, which by proper treatment may be averted.

CEREBRAL SOFTENING.—In softening of the brain, DR. HAMMOND has found Phosphorus of distinct and great advantage; but, as it is reasonable to expect, its effects are more marked in those cases in which the softening is insidious and gradual in its attack, than in those in which it results from thrombus, embolism, or hemorrhage. The author gives two examples in which the illness supervened on much excessive mental application, and in which perfect recovery was noted.

Convenience, as well as other reasons, would lead to the substitution of a pill.

He presents one case of brain softening which occurred in a clerk aged fifty, who had rheumatic fever at the age of twenty-five, but, he alleges, without any cardiac complication.

Since then he has been subject to attacks, sometimes of gout and sometimes of muscular rheumatism, recurring two or three times a year.

The heart sounds are normal, and the health in other respects good.

After the attack of acute rheumatism his hair fell off; and what remained of it, or grew subsequently, is quite white.

The illness began with a little difficulty in writing, which seemed to consist in loss of free movement of the fingers simply. On the second day this symptom had increased, and was accompanied by tingling, which affected the whole of the lower half of the right hand, but was more intense in the ring and little fingers, and the ulnar side of it.

On the third day there was numbness of the same parts, and the tingling was also felt in the right side of the trunk. Neither the leg nor the arm suffered, nor was any other symptom of illness detected.

On the fifth day, the other symptoms remaining in *statu quo*, a distinct loss of directing power was observed in the right extremity, but indefinite movements of the limb were performed readily.

There was also loss of muscular power, as indicated by the grasp. After five weeks of treatment with alterative and tonic medicines, all the symptoms related were present, as at first. There was no improvement. During that time there had been a little depression of spirits, but no other symptom. He was then placed under Phosphorus treatment. Improvement was at once observed; in a week the tingling disappeared from the sides, and then it began to leave the fingers; at the same time the power of direction was recovered.

The numbness next left, so that he was able to pick a pin off a hard table; and at the end of a month he was again able to write, not with

his usual freedom, nor without effort, but fairly well. The muscular power had increased, and there was still further improvement distinctly traced to the remedy employed.

SKIN DISEASES.—A large class of cutaneous diseases arise from defective nutrition, and are directly traceable to debility, break down of the peripheral, together with the central nerve-power, resulting from overwork and intense anxiety of mind; others are diathetic and some are purely neurotic. In skin diseases arising in this way Phosphorus is exceedingly useful, particularly in psoriasis, chronic eczema, pruritus, and those forms of *strumous* and cachectic affections of the skin usually treated with arsenic, cod-liver oil, and other nervine tonics. It is to be always remembered, that in the treatment of these affections local treatment must not be neglected.

In a paper contributed to the *Dublin Journal of Medical Science*, Dr. Eames speaks of Phosphorus as being more than a substitute for arsenic; that he has succeeded in curing cases with it where arsenic entirely failed.

DIRECTIONS FOR REGIMEN, DIET, ETC.,
IN THE TREATMENT
OF
FUNCTIONAL DISORDERS OF THE NERVOUS SYSTEM.

THE recognition of THE DISTURBING CAUSE is the key to the successful treatment of *loss of nerve-power* and all its various manifestations. It is advisable, therefore, to get from the patient a faithful history of his or her case. It is in vain to enforce rules, fix diet, limiting supplies and forbidding luxuries, in vain to harass the patient with all kinds of directions and prohibitions if, in ignorance of the *one* essential element of the disease we leave *it uninfluenced*.

As already stated, the remedies which act most beneficially are: 1. Phosphorus; 2. Quinine; 3. Nux Vomica or Strychnia; 4. Digitalis; 5. Iron.

Regimen and the regulation of diet are subjects of the utmost importance in the treatment of all disease. They are especially so in disorders affecting nutrition of the nervous system. A single error in diet or regimen may delay or hinder the success of any plan of treatment however well devised, and therefore the few practical suggestions which it is ventured to offer under this head will not be considered superfluous in a treatise on the employment of a new, to many an untried, remedy. It will be understood that they are only intended to indicate general principles of management, while very many cases will require particular directions.

Before commencing, as well as during the Phosphorus treatment, attention must be paid to what is understood as the "general health,"—the condition of the digestive organs, the biliary and renal secretions, the action of the bowels, etc., and suitable remedies must also be prescribed for functional disorders.

CONSTIPATION is a very constant concomitant of nervous disorders, and a cause of much mischief as well as discomfort if not removed. Not uncommonly it is due simply to want of tone (nerve-power) in the muscular coat of the bowels, and is then best treated by adding Nux Vomica to the Phosphorus. When it occurs from diminished secretion of bile, mild mercurials may be given; if these be objected to, Podophyllin will be found an excellent substitute for Mercury; it may be

given from time to time in small doses as an alterative as well as an aperient.

PORTAL CONGESTION should be relieved by ACTIVE APERIENTS. In most cases the bowels should be acted upon once a day. An occasional dose of simple aperient medicine will effectually prevent "clogging of the liver," which some writers affirm occurs during a course of Phosphorus.

DIET.—Patients should be satisfied with simple but good nutritious food; it should consist of a moderate amount of fresh meat, mutton, or beef, well but not over dressed, game or poultry, fresh vegetables,* and a liberal supply of cream, butter, and other animal fats. Eggs, when fresh and uncooked, are very digestible and highly nutritious. In cases of extreme debility, as many as half a dozen may be taken daily. Fresh fish of all kinds are generally admissible. For breakfast, coffee is a good beverage; it is an agreeable stimulant, and if not too exciting is more refreshing than cocoa or tea, the latter (not green tea) may be taken, however, if preferred, once or twice a day, but not oftener. The quantity as well as the kind of food must, however, in a great measure be determined by the digestive power of the patient, but over feeding is to be especially guarded against. Nervous patients, as a rule, are dyspeptics, and their digestive power is much impaired. Milk and farinaceous substances, such as lentilmeal (*revvalenta*), corn-flour, macaroni, and other Italian pastes, with a little fresh fish or meat broth once a day, will be found better borne by most invalids than solid animal food. The extract of meat (Liebig) has very little nutritive value, but nevertheless it is useful; a cup of strong broth made with it may be ordered to be taken once or twice during the night with a dose of Phosphorus, when nervous exhaustion is very marked. In treating nervous debility it is a common practice to recommend animal food two or three times a day. "Heavy meals" are great evils, they embarrass digestion, and arrest rather than favor nutrition, and in my experience are highly injurious. Nitrogenous food, taken in excess, loads the blood with the products of disassimilation, embarrasses the circulation, and unnecessarily taxes the excretory organs. The quantity of animal food should, as far as possible, be regulated by the power to assimilate, which, in some cases, owing to lowered nervous power, is, as already observed, in a very languid condition.

The moderate use of wine and spirits, rather than total abstinence,

* Not always admissible in acute dyspepsia.

is, in most cases desirable. It is a common practice, but a fatal error, to seek relief from nervous depression in an excessive use of alcoholic drinks. Beer of all kinds, as a rule, is not well borne, it is apt to impair and delay digestion and to charge the urine with lithates. There are, however, some exceptions to the rule; in *cerebral paresis*, for instance, patients are much benefited by a judicious use of both wine and beer. The habitual use of alcohol, if excessive, we have already shown, is a destroyer of nerve-power, and its moderate use is only to be permitted as a medicine, and the quantity allowed should be definitely defined. Tobacco operates as a powerful sedative and depressor of nerve-force, and for this reason should be used with great moderation or abandoned. The influence of habit in the use of this narcotic must be taken into account.

From what has been said it will be inferred that matters of this kind are of practical importance in the treatment of the several diseases under consideration, and patients should be made to understand that they must strictly conform to the prescribed regimen. I usually make it the subject of a separate prescription, and state definitely, for the guidance of the patient, what may and what may not be taken.

SLEEP.—Want of sleep, we have already seen, is one of the earliest symptoms of loss of nerve-power, of an over-fatigued, over-worked brain, and one of the first that will be relieved by Phosphorus, a very significant fact indeed. The importance of sleep will be at once apparent when we call to mind its physiology. "Simple repose suffices to relieve fatigue of the muscles; but sound sleep, and sound sleep alone, relieves fatigue of the brain; without it there can be no rest for the organ, and no repair of its tissue." When, therefore, this is wanting, imperfect, or broken, little progress towards regaining power can be made: and if, therefore, wakefulness be not speedily relieved by Phosphorus, as it very generally is, affording the most satisfactory evidence of its beneficial operation, a dose of Chloral, or a combination of it with Indian Hemp and Morphia at bedtime, may be ordered, especially if much nervous excitement co-exists. The Bromide of Ammonium, in from 15 to 30 grain doses, is very useful in these cases, and seldom fails to produce refreshing sleep when Opium or Chloral is not admissible.

Gouty and Rheumatic Affections, Albuminuria, Secondary Syphilis, and other diathetic conditions, it is known, operate as powerful depressants, and add to our difficulties in the treatment of functional disorders of the nervous system. These affections are prevalent among the over-worked and under-fed, as well as the over-fed and, it may be,

under-worked as well as *over-worked*. In such complications, but in the acid diathesis especially, it is necessary to regulate the diet with great care. The alkaline mineral waters are useful; seltzer or potash may be taken during meals.* Early hours, and the daily use of the bath, cold or tepid, according to the constitution and habits of the patient; cold, either plunge, douche, or sponge, should be preferred. The *Turkish Bath* is also exceedingly useful in many disorders of the nervous system. In cases complicated with Gout or Rheumatism it must on no account be omitted; indeed, it may always be safely prescribed when there is no heart disease. Late hours, involving loss of rest and excessive nervous excitement, and dissipation of all kinds, tending directly or indirectly to fatigue or exhaust nervous force, must of course be abandoned. Regular exercise in the open air should be recommended as a *necessary* part of the treatment. Some men whose busy brains, during long business hours, have been closely engaged in financial or commercial schemes, unwisely seek relief, or as they call it *change*, in card-playing, and in the excitement of gaming; this is a very bad practice. It adds fuel to the fire by increasing wear and tear, and by curtailing the period of *necessary repose*. The repair of nervous tissue is retarded, and the reaction of depression which always follows every kind of abnormal and excessive nervous excitement is prolonged.

^{*}PHYSIOLOGICAL REST.—This subject remains to be noticed; and it is not an unimportant one. I have already said that absolute repose is necessary to the nutrition of the brain; this is only secured by natural sleep. But repose should be secured by day as well as by night, and this is best done by an entire abstention from the occupations which have overtaxed the mind, and by mental distractions of a pleasurable kind. Change of air and scene assist this; in some cases are essential to recovery. In *softening of the brain* in particular, no treatment will avail unless supplemented by a *complete cessation* from work, and by change of air and scene.

In the treatment of the condition described as *below par*, complete rest is a *sine quâ non*, and whenever practicable this must be associated with change of some sort.

In *cerebral paresis* supervening on excessive mental application, mere cessation from the routine of daily duties is insufficient: the brain needs wholesome *exercise* as well as repose, and this is best attained by

* Vichy, Pullna and Friedrichshall are useful as aperients. They should be taken before breakfast. The addition of a little *hot* water is found to increase their aperient action.

new and pleasurable occupations, providing they be quite different in character. In most cases travel is found an efficacious and powerful restorer of nerve-power and energy. It calls into play faculties and emotions of the mind which may long have lain dormant, and reposes others that have been overstrained and weakened. New occupations, providing they be quite different in character from what has gone before, afford rest to a mind that has been overworked on one subject. The symptoms and history of every case will indicate where the strain has been most severe, and what functions have been most overtaxed, and help us to advise specifically on this subject.

It is, however, with no small difficulty that patients are prevailed upon to give up or curtail work which has long engrossed the energies of both heart and brain; they will often persistently refuse to accede to the advice of the physician or to the entreaty of friends until it is too late to avail. It is only by a dearly bought experience they learn how vain it is for the will to persist when the body refuses to follow.

To sum up the general principles of the employment of Phosphorus as a nerve tonic, for which it is recommended by no less authority than Prof. Delpech, Prof. Fisher of Berlin, Dr. Eames (*Dublin Journal*), Dr. Burgess, and Dr. Hammond of New York, the special treatment indicated in these cases is:

1st. Complete rest of mind, especially abstention from all occupations resembling that upon which the mind has been overworked.

2d. The encouragement of any new hobby or study not in itself painful, which the patient might select.

3d. Tranquility to the senses, which expressly give in these cases incorrect impressions, putting only those objects before them calculated to soothe the mind.

4th. A very nourishing diet, especially of shell fish.

5th. The internal administration of Phosphorus in pilular form, prepared by WM. R. WARNER & Co.

FORMULÆ*

FOR THE ADMINISTRATION OF FREE PHOSPHORUS

IN COMBINATION WITH

Iron, Quinine, Zinc, Nux Vomica, Strychnia, Morphia, Indian Hemp,
Cantharides, Digitalis, Aloes, etc.

A TABLE OF COMBINATIONS.

R

- 1—PIL. PHOSPHORI 1-100 grain, 1-50 grain, 1-25 grain, in each.
- 2—PIL. PHOSPHORI COMP. { Phosphori 1-100 grain.
Ext. Nuc. Vom. $\frac{1}{4}$ grain.
- 3—PIL. PHOSPHORI CUM NUC. VOM. { Phosphori 1-50 grain.
Ext. Nuc. Vom. $\frac{1}{8}$ grain.
- 4—PIL. PHOSPHORI CUM FERRO, { Phosphori 1-50 grain.
Ferri Red. 1 grain.
- 5—PIL. PHOSPHORI CUM FERRO ET NUC. VOM. { Phosphori 1-100 grain.
Ferri Carb. 1 grain.
Ext. Nuc. Vom. $\frac{1}{4}$ grain.
- 6—PIL. PHOSPHORI CUM FERRO ET QUINIA, { Phosphori 1-100 grain.
Ferri Carb. 1 grain.
Quiniaz Sul. 1 grain.
- 7—PIL. PHOSPHORI CUM FERRO ET QUINIA ET NUC. VOM. { Phosphori 1-100 gr.
Ferri Carb. 1 gr.
Quiniaz Sul. 1 gr.
Ext. Nuc. Vom. $\frac{1}{4}$ gr.
- 8—PIL. PHOSPHORI CUM QUINIA, { Phosphori 1-50 grain.
Quiniaz Sul. 1 grain.
- 9—PIL. PHOSPHORI CUM QUINIA CO., { Phosphori 1-50 grain.
Ferri Red. 1 grain.
Quiniaz Sul. $\frac{1}{2}$ grain.
Strychniaz 1-60 grain.
- 10—PIL. PHOSPHORI CUM QUINIA ET NUC. VOM., { Phosphori 1-50 grain.
Quiniaz Sul. 1 grain.
Ext. Nuc. Vom. $\frac{1}{4}$ gr.
- 11—PIL. PHOSPHORI CUM QUINIA ET DIGITALE CO., { Phosphori 1-50 grain.
Quiniaz Sul. $\frac{1}{2}$ grain.
Pv. Digitalis $\frac{1}{2}$ gr.
Pv. Opii $\frac{1}{4}$ grain.
Pv. Ipecac. $\frac{1}{4}$ grain.
- 12—PIL. PHOSPHORI CUM DIGITALE CO., { Phosphori 1-50 grain.
Pv. Digitalis 1 grain.
Ext. Hyoscy. 1 grain.
- 13—PIL. PHOSPHORI CUM DIGITALE ET FERRO, { Phosphori 1-50 grain.
Pv. Digitalis 1 grain.
Ferri Red. 1 grain.
- 14—PIL. PHOSPHORI CUM CANNABE INDICA, { Phosphori 1-50 grain.
Ext. Cannab. Ind. $\frac{1}{4}$ grain.
- 15—PIL. PHOSPHORI CUM MORPHIA ET ZINCI VALER. { Phosphori 1-50 grain.
Morphiaz Sul. 1-12 grain.
Zinci Valer. 1 grain.
- 16—PIL. PHOSPHORI CUM ALOE ET NUCE VOMICA, { Phosphori 1-50 grain.
Ext. Aloes Aq. $\frac{1}{2}$ gr.
Ext. Nuc. Vom. $\frac{1}{4}$ gr.
- 17—PIL. PHOSPHORI CUM ZINCO CO. { Phosphori 1-50 grain.
Zinci Sul. 1 grain.
Lupulinaz 1 grain.
- 18—PIL. PHOSPHORI CUM OPIO ET DIGITALE, { Phosphori 1-50 grain.
Pv. Digitalis $\frac{1}{2}$ grain.
Pv. Ipecac. $\frac{1}{4}$ grain.
Pv. Opii $\frac{1}{4}$ grain.
- 19—PIL. PHOSPHORI CUM STRYCHNIA, { Phosphori 1-50 grain.
Strychniaz 1-60 grain.
- 20—PIL. PHOSPHORI CUM CANTHARIDE CO., { Phosphori 1-50 grain.
Pv. Nuc. Vom. 1 grain.
Sol Cantharidis Con. 1llj.

* Prepared by WM. R. WARNER & CO.

FORMULÆ.

[1.]

PIL. PHOSPHORI 1-100 gr., 1-50 gr., or 1-25 gr.

Dose—One pill, twice or three times a day, at meals.

THE REMEDIAL USES OF PHOSPHORUS have already been fully discussed. When the indications can be filled by Phosphorus alone, these pills which contain the usual dose of free Phosphorus, will be found, not only convenient, but thoroughly reliable and safe.

[2.]

PIL. PHOSPHORI COMP.

R Phosphori, 1-100 gr.; Ext. Nucis Vomicae, $\frac{1}{4}$ gr.

Dose—One or two pills three times a day, after meals.

THERAPEUTICS.—PHOSPHORUS and NUX VOMICA, in the proportions above indicated, form a mild but valuable remedy. As a nutritive tonic and stimulant to the nervous system, especially the spinal cord, this pill is admirably adapted for the treatment of a large number of nervous disorders dependent on defective nutrition and debility of the spinal column. It increases appetite and promotes digestion. In this dose Phosphorus may be safely given even to children in those diseases in which the hypophosphites are employed with advantage.

[3.]

PIL. PHOSPHORI CUM NUCE VOMICÆ.

R Phosphori, 1-50 gr.; Ext. Nucis Vom., $\frac{1}{8}$ gr.

Dose—One or two three times a day with food.

THERAPEUTICS.—This combination is especially indicated in *atonic dyspepsia*, *lowness of spirits*, and in that condition of general depression and loss of power popularly known as “*below par*,” and in *break-down* from overwork or mental fatigue. PHOSPHORUS and NUX VOMICA are probably the only *medicines* which can be relied upon as *sexual stimulants*, and possesses real aphrodisiac power. Their administration, however, with this view requires circumspection: large doses are not

necessary nor desirable, neither should they be long-continued without cessation; one or two pills twice or three times a day, according to the circumstances of the case, may safely be prescribed for two or three weeks in succession with advantage.

[4.]

PIL. PHOSPHORI CUM FERRO.

R Phosphori, 1-50 gr.; Ferri Redacti, 1 gr.

Dose for Adults—Two, twice or three times a day, with food.
For Children between 7 and 12 years of age—One, twice or thrice daily, with food.

THERAPEUTICS.—PHOSPHORUS and IRON, as it has already been said, is a powerful nervine tonic and blood restorer. It is especially valuable in tubercular diseases, *consumption*, *tuberculosis mesenterica*, *scrofula*, and the strumous diseases and cachectic conditions of children. It is given with great advantage in *anæmia*, *chlorosis*, in *sciatica*, and other neuralgic affections; also in furuncular inflammations, carbuncles, boils, etc., etc. This pill is very suitable for anæmic children. An admirable adjuvant to a course of cod liver oil.

[5.]

PIL. PHOSPHORI CUM FERRO ET NUCE VOMICÆ.

R Phosphori, 1-100 gr.; Ferri Carb., 1 gr.; Ext. Nucis Vom., $\frac{1}{4}$ gr.

Dose—One or two pills three times a day, with food.

THERAPEUTICS.—See *Pil. Phosphori cum Ferro*. Mr. Jabez Hogg believes this formula will be found extremely valuable in atrophy of the optic nerve.

It is especially beneficial in anæmic conditions and sexual debility, and in neuralgia occurring in persons who have exhausted the vital powers by dissipation or excesses.

[6.]

PIL. PHOSPHORI CUM FERRO ET QUININÆ.

R Phosphori, 1-100 gr.; Ferri Carb., 1 gr.; Quininx Sulph., 1 gr.

Dose—One pill three times a day, with food.

THERAPEUTICS.—The uses of IRON and QUININE in combination are too well known to need any remark. PHOSPHORUS intensifies their action, while it imparts additional power by stimulating the nutrition of the nervous system. This is an excellent tonic in general debility, and a valuable combination in cerebral anæmia and spinal irritation.

(7.)

PIL. PHOSPHORI CUM FERRO ET QUINIÂ ET NUCE VOMICÂ.

R Phosphori, 1-100 gr.; Ferri Carb., 1 gr.; Ext. Nuc. Vom., $\frac{1}{4}$ gr.; Quinæ Sul., 1 gr.

Dose—One pill three times a day, with food.

THERAPEUTICS.—The action of IRON, QUINIA and NUC VOMICA, intensified by PHOSPHORUS, imparting additional power by stimulating the nutrition of the nervous system.

[8.]

PIL. PHOSPHORI CUM QUINIÂ.

R Phosphori, 1-50 gr.; Quinæ Sulph., 1 gr.

Dose for Children from 7 to 10 years—One pill three times a day.
For Adults—Two twice or three times a day, at meals.

THERAPEUTICS.—PHOSPHORISED QUININE is a valuable combination of two powerful *restoratives*. Acting as a nutrient tonic to the entire nervous system, it gives power to the brain and spinal cord, and to the functions presided over by the organic nervous centres. Imparting tone to the digestive organs, it gives strength to, and improves the condition of the whole system. As a nutritive tonic, this pill is one of the best that can be devised. In most cases where Quinine is indicated, it may be prescribed with great advantage, it being more active given in this form than when administered alone.

[9.]

PIL. PHOSPHORI CUM QUINIÂ COMP.

R Phosphori, 1-50 gr.; Ferri Redacti, 1 gr.; Quinæ Sulph., $\frac{1}{2}$ gr.; Strychniæ, 1 60 gr.

Dose—One pill three times a day, with food.

THERAPEUTICS.—This is a valuable and highly efficient combination of nerve tonics. It will be found exceedingly efficacious in that numerous class of disorders which is characterized by impoverished blood and diminished nerve-power, and which is often induced by overwork, by dissipation, and by excesses of various kinds, a condition in which Iron and Phosphorus are strongly indicated. It must be obvious that this preparation is admirably adapted to effect the purposes for which these powerful therapeutic agents are usually prescribed. It will be found more effectual than the Hypophosphites and other feeble modes of exhibiting Phosphorus.

[10.]

PIL. PHOSPHORI CUM QUINIÂ ET NUCE VOMICÂ.

R Phosphori, 1-50 gr.; Quiniæ Sulph., 1 gr.; Ext. Nucis Vom.,
 $\frac{1}{4}$ gr.

Dose for Adults—One or two twice or three times a day, with food.

For Children—One pill twice or three times a day.

For the use of this valuable combination, see *Pil. Phosphori cum Quinia*, formula No. 8.

[11.]

PIL. PHOSPHORI CUM QUINIÂ ET DIGITALE COMP.

R Phosphori, 1-50 gr.; Quiniæ Sulph. $\frac{1}{2}$ gr.; Pulv. Digitalis,
 $\frac{1}{2}$ gr.; Pulv. Opii, $\frac{1}{4}$ gr.; Pulv. Ipecac. $\frac{1}{4}$ gr.

Dose—One or two pills every six or eight hours, with food.

THERAPEUTICS.—Formula No. 18.

Dr. Niemeyer, in his "Practical Medicine," highly commends these combinations in the treatment of consumption; he recommends them as antipyretics. DIGITALIS and QUININE have a well-merited reputation as a means of arresting abnormal calorification and reducing animal heat. This preparation is especially appropriate in cases of phthisis, when fever of a periodic type, marked by chills and evening exacerbations, is present.

The addition of Phosphorus in small doses, operating as a *nutritive tonic*, cannot fail to give additional value to these medicines.

[12.]

PIL. PHOSPHORI CUM DIGITALE COMP.

R Phosphori, 1-50 gr.; Pulv. Digitalis, 1 gr.; Ext. Hyoscyami,
 1 gr.

Dose—The administration of Digitalis always requires caution. One pill may be taken thrice or four times in twenty-four hours. It is well to allow an interval of six or eight hours between each dose. And when it is long continued it is necessary to examine the pulse (in the sitting and erect posture) every few days. This combination should only be given when *medical supervision* is practicable.

THERAPEUTICS.—The action of DIGITALIS on the involuntary muscular fibre is analogous to that of *Strychnia* and *Nux Vomica* on the voluntary muscular system, viz., it increases contractile force. "We must be guided," says Dr. John Harley, "by this fundamental fact, that

it directly promotes constriction of the involuntary muscular fibre." The combination of PHOSPHORUS with DIGITALIS is a very happy one, the effect being to promote increase of nerve and muscular power. As a *Heart Tonic* it is a valuable medicine in those conditions of debility of the muscular fibre which are so commonly induced by persistent mental and physical over-work, and of which irregular or intermittent action is often the indication. It is useful also as a sedative, to control undue action from general nervous irritability, and in the *palpitation* attending debility, *exophthalmic goitre*, *valvular disease*, and *aneurism*. On account of its power to *increase* the *contractile* force of the muscle, Digitalis has been called the "quinine of the heart."

As a diuretic, the combination operates actively; it is indicated in cardiac and renal dropsy, and in Bright's disease. Digitalis acts directly on the kidneys as well as through its effects on the heart, and the flow of urine is often copious, and the relief afforded very striking.

[13.]

PIL. PHOSPHORI CUM DIGITALE ET FERRO.

R Phosphori, 1-50 gr.; Pulv. Digitalis, 1 gr.; Ferri Redacti, 1 gr.

Dose—One pill three or four times a day, with food.

THERAPEUTICS.—Of the remedial value of PHOSPHORUS and IRON enough has been said. In its combination with DIGITALIS we have an admirable tonic which cannot fail to be useful in the treatment of many forms of heart disease. It is administered as a tonic to the heart with great advantage in all *anemic* conditions associated with feeble and irregular action, palpitation, etc.

[14.]

PIL. PHOSPHORI CUM CANNABE INDIC^A.

R Phosphori, 1-50 gr.; Ext. Cannabis Ind., $\frac{1}{4}$ gr.

Dose—One or two twice or three times a day, with food.

When Morphia is contra-indicated, and sleep is to be produced, this combination may be employed in place of formula 15, Pil. Phosphori cum Morphia Comp.

A good aphrodisiac in some cases, where the combination with Nux Vomica fails, or is contra-indicated.

[15.]

PIL. PHOSPHORI CUM MORPHI^A ET ZINCI VALER.

R Phosphori, 1-50 gr.; Morphiæ Sulph., 1-12 gr.; Zinc. Valer., 1 gr.

Dose—One twice or thrice daily, or two at bedtime.

THERAPEUTICS.—In phthisis when accompanied with hysterical irritability and troublesome cough, and with but little febrile disturbance, it both soothes and supports. *Nervous Cough*—one of the innumerable manifestations of hysteria—is relieved by this combination. It may be advantageously administered with *cod-liver oil*. I have seen cases in which marked improvement has resulted from a course of this treatment. In the early stages of Phthisis, Phosphorus should be taken in *small doses*.

Free Phosphorus is a more efficient and reliable remedy for the treatment of consumption than the Hypophosphites, recommended by Dr. Churchill.* In some forms of neuralgia this formula may be substituted for that containing Quinine.

In severe cases two pills may be given as a dose.

[16.]

PIL. PHOSPHORI CUM ALOE ET NUCE VOMICÆ.

R Phosphori, 1-50 gr.; Ext. Aloes Aquosæ, $\frac{1}{2}$ gr.; Ext. Nucis Vomicæ, $\frac{1}{4}$ gr.

Dose—One every day *with* or immediately after luncheon or dinner. As a dinner pill it fills many indications.

THERAPEUTICS.—It is useful especially in the *atonic form of dyspepsia* and *neuroses of the stomach, hypochondria*, and other nervous affections associated with habitual constipation. It is also *advantageously* employed as an occasional substitute for combinations with iron, which sometimes induce constipation.

[17.]

PIL. PHOSPHORI CUM ZINCO COMP.

R Phosphori, 1-50 gr.; Zinci Sulphatis, 1 gr.; Lupulinæ, 1 gr.

Dose for Adults—One or two, three times a day. *For Children*—One, two or three times a day.

THERAPEUTICS.—This combination has been found exceedingly useful in the treatment of the diseases peculiar to women, *uterine disturbances, torpidity of function*, with *leucorrhœa, dysmenorrhœa*, and *hysteria*; also in *melancholia*, and other mental derangements, occurring on the appearance and cessation of the menses.

[18.]

PIL. PHOSPHORI CUM OPIO ET DIGITALE.

R Phosphori, 1-50 gr.; Pulv. Digitalis, $\frac{1}{2}$ gr.; Pulv. Ipecac. $\frac{1}{4}$ gr.; Pulv. Opii, $\frac{1}{4}$ gr.

* See *Ranking's Abstract*, vol. xxvi., page 41.

Dose—One or two pills every six or eight hours.

THERAPEUTICS.—The same as Pil. Phosphori cum Quinia et Digitali, formula 11, in cases in which Quinine is inadmissible.

(19.)

PIL. PHOSPHORI CUM STRYCHNIA.

R. Phosphori, 1-50 gr.; Strychniæ, 1-60 gr.

Dose—One twice or thrice a day.

THERAPEUTICS.—Precisely that of PHOSPHORUS and NUX VOMICA, formula 3. This combination will be employed when a stronger dose of PHOSPHORUS is indicated, or STRYCHNIA preferred to Nux Vomica.

[20.]

PIL. PHOSPHORI CUM CANTHARIDE COMP.

R Phosphori, 1-50 gr.; Sol. Cantharidis, concentrated, 1 m; Pulv. Nucis Vom., 1 gr.

Dose—One or two pills, twice or three times a day, with food.

THERAPEUTICS.—The employment of CANTHARIDES, *internally*, has been much overlooked. It is highly spoken of by all modern writers on Therapeutics, and in certain cases I have found it to possess very remarkable remedial power. When administered in this form it does not produce any irritation of the gastro-intestinal mucous membrane, but operates as a *gentle stimulant* to the genito-urinal organs. In Bright's disease, after the acute symptoms have subsided, this preparation with the Perchloride of Iron operates very beneficially. It is useful also in *chronic* urethral discharges, obstinate gleet, etc. It is especially useful in atony or paralysis of the bladder, producing incontinence or retention of urine, and in the dysuria of old men. It has been employed with much success in premature failure of sexual power resulting from excesses or self-abuse in early life, and in impotence induced by passive seminal discharges.

As a stimulating emmenagogue and diuretic, it is useful in obstinate cases of amenorrhœa, and also in atony of the uterus and leucorrhœal discharges.

In some forms of *chronic* skin diseases, *eczema* and *psoriasis*, this combination promises to be very useful.

Middle-aged women frequently suffer much from weakness of the sphincter of the bladder—are unable to “hold their water,” and are troubled by a constant desire to pass it. These cases are much relieved by small doses of CANTHARIDES and PHOSPHORUS, the latter increasing nerve-power.

ADVERTISEMENT.

WARNER & CO'S
PHOSPHORUS PILLS.

The method of preparing Phosphorus in pilular form has been discovered and brought to perfection by us. The element is in a perfect state of subdivision and incorporated with the excipient while in solution. The non-porous coating of sugar protects it thoroughly from oxidation, so that the pill is not impaired by age. See our complete list of Pil: Phosphori with combinations.

Specify WARNER & CO. when prescribing, and order in bottles of one hundred each when practicable, to avoid the substitution of cheaper and inferior brands.

The following letter, in addition to our Centennial award, is but a portion of the testimony as to the perfect preparation of our Pil: Phosphori.

WM. R. WARNER & CO.

Philadelphia.

NEW YORK, NOVEMBER 11th, 1877.

Messrs. WM. R. WARNER & Co.,

Manufacturing Chemists, &c., Philadelphia, Pa.

GENTLEMEN:—

The Phosphorus Pills submitted to me for chemical analysis and microscopic examination, afford only traces of Phosphoric Acid, and contain the one-twenty-fifth of a grain (gr. 1-25) of the element in each Pill, as expressed upon the label; they do not exhibit particles of undivided Phosphorus, the mass being perfectly homogeneous in composition, soft in consistence, and thoroughly protected by the non-porous coating of sugar from the oxidizing influence of the air. Each Pill is an example of what skill, care and elegant Pharmacy can do,—I regard them as a marvel of perfection.

Very respectfully,

A. E. McLEAN,

Analytical Chemist and Microscopist,

40 and 42 Broadway, N. Y.

Late of Gardner & Ainstie's Laboratory, Edinburgh, Scotland.

